

a rule. (This is because it is doing backward chaining—start with the conclusion, and then prove the premises). Var# is an identifier for the engine to do faster searching. Each new variable added to the table has a unique identifier. The variables are DeskMate components, like a dialog box. Var, the variable field, is a string representing a variable for which a value is expected such as "running.cmp" (DISABLED FIELD). Value is the string field which contains a value. If the value is the current one for the variable, then the premise line succeeds. Bind is a binding variable. If a rule has a binding, the variable will bind to the currently known value of the variable. This eliminates repetition of rules that do the same exact thing. Only premises can bind. KeyW is a number indicating the negation (NOT) of a premise, or a TEST or CALL TEST will do number comparisons, and assumes the value string field is a numerical value. CALL is used to execute a pre-defined function. The parameters of the function are placed in the value field. Q# is the number in queue 332 for which a premise line test applies. If the queue number equals 0, it is assumed the premise does not use predefined data.

While the invention is described in some detail with specific reference to a single preferred embodiment and certain alternatives, there is no intent to limit the invention to that particular embodiment or those specific alternatives. For example, one skilled in the art could implement such a help system in another interface environment or without any interface environment. Backward-chaining is but one of many possible AI techniques used to process data and rules, other possible techniques include forward-chaining and rule-value methods. Input device is not limited to a keyboard and a pointing device but contemplates any means by which data enters a computer, such as by voice recognition. Help information is not limited to a specific medium but instead includes any conveyance of help information, such as graphical representations. The true scope of the invention is defined not by the foregoing description but by the following claims.

What is claimed is:

1. In a computer system, a method for aiding a user of a computer program, said method operating independent of said computer program, comprising the steps of:
 - storing a help information database;
 - monitoring a series of user-directed events from an input device;
 - generating data indicating said series of user-directed events;
 - storing said generated data in a knowledge base;
 - storing a plurality of rules for analyzing said generated data to determine appropriate help information;
 - detecting a request for help information from the user;
 - testing said rules against said generated data using an inference engine, whereby rules which are satisfied by said data are proved rules;
 - selecting in response to the proved rules appropriate help information from said help information database; and
 - displaying said selected help information to the user.
2. The method of claim 1, wherein said monitoring step further comprises monitoring a system state.
3. The method of claim 2, wherein said monitoring a system state step further comprises monitoring a machine state, an application state, an accessory state, and a component state.

help

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4. The method of claim 1, wherein said monitoring step further comprises the steps of:

- registering an application's menu bar;
- checking if the user has requested help;
- updating a state information; and
- updating a menu bar.

5. The method of claim 1, wherein said testing step comprises the steps of:

- (a) selecting from said plurality of rules a first group of rules corresponding to a first plurality of user-directed events;
- (b) attempting to prove each rule in said first group of rules;
- (c) if a rule is proved, storing said rule as a proved rule in a plurality of proved rules; and
- (d) repeating steps (a)-(c) for a subsequent group of rules until a rule is proved.

6. The method of claim 5, wherein step (b) comprises attempting to match a premise with each of said first group of rules with said generated data.

7. The method of claim 5, wherein step (c) comprises: if a rule is proved, storing said rule as a proved rule in a plurality of linked proved rules.

8. The method of claim 1, wherein said generating data step comprises generating an historical queue of said user-directed events.

9. The method of claim 1, wherein said rule storing step comprises storing premise-conclusion statements from said help information database.

10. The method of claim 1, wherein said displaying step comprises displaying textual help information to the user.

11. The method of claim 1, wherein said displaying step comprises displaying graphical help information to the user.

12. The method of claim 1, wherein said testing step comprises testing said rules against said generated data using a backward-chaining inference engine.

13. The method of claim 1, wherein said testing step comprises testing rules against said generated data using a forward-chaining inference engine.

14. In a computer system, a method for aiding a user of a computer program, said method operating independent of said computer program, comprising the steps of:

- storing a help information database;
- storing a knowledge base for maintaining data;
- identifying a series of user-directed events;
- comparing said identified series with data stored in the knowledge base;

if said identified series is unknown to said knowledge base, asserting in said knowledge base data for indicating said unknown identified series;

if said identified series contradicts said knowledge base, retracting in said knowledge base data which contradicts said identified series;

if said identified series is already known to said knowledge base, reasserting in said knowledge base data for indicating said already known identified series;

storing a plurality of rules for analyzing said knowledge base to determine appropriate help information;

detecting a request for help information from the user;

testing said rules against said knowledge from the user;

testing said rules against said knowledge base using an inference engine, whereby rules which are satisfied

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by data stored in the knowledge base are proved rules;

selecting in response to said testing step appropriate help information from said help information database; and

displaying said selected help information to the user.

15. A help information system for aiding a user comprising:

a computer having a processor and a memory;

a display device coupled to said computer;

an input device coupled to said computer;

monitoring means coupled to the input device for monitoring a sequence of user-directed events and for generating data indicating said events;

a knowledge base coupled to said monitoring means and stored in said memory, said knowledge base comprising said generated data, a plurality of rules for analyzing said generated data to determine appropriate help information, and a help information database for storing said appropriate help information;

inference engine means, coupled to said knowledge base, for applying said rules to said data to generate an inference engine outputs and

display engine means, coupled to said inference engine and coupled to said help information database, for interpreting said inference engine output to select appropriate help information for display by said display device to the user.

16. The system of claim 15, wherein said monitoring means further comprises means for monitoring a system state.

17. The system of claim 16, wherein said means for monitoring a system state comprises means for monitoring a machine state, an application state, an accessory state, and a component state.

18. The system of claim 15, wherein said monitoring means comprises means, stored in memory and operably coupled to the input device, for interpreting a series of user-directed events and performing a history update based on the series.

19. The system of claim 15, wherein said knowledge base further comprises an historical queue stored in memory and operably coupled to said generated data.

20. The system of claim 15, wherein said inference engine means comprises backward-chaining inference engine means.

21. The system of claim 15, wherein said inference engine means comprises forward-chaining inference engine means.

22. The system of claim 15, wherein said help information comprises textual help information.

23. The system of claim 15, wherein said help information comprises graphical help information.

24. A help information system for aiding a user comprising:

a computer having a processor and a memory;

an input device coupled to said computer;

a knowledge base, coupled to said memory, for maintaining data;

a plurality of rules, coupled to said memory, for analyzing said knowledge base;

means, coupled to said memory, for identifying a series of user-directed events from said input device;

means, coupled to said memory, for updating said knowledge base with said identified series;

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means, coupled to said memory, for detecting a request for help information from the user;
a help information database, coupled to said memory, for selecting appropriate help information;
an inference engine, coupled to said memory, for testing said rules against said knowledge base to generate a help solution tag;
a display engine, coupled to said memory, for selecting help information from said help information database using said help solution tag; and
a display for displaying said selected help information to the user.

25. The system of claim 24, wherein said means for updating said knowledge base comprises programming

25. The system of claim 24, wherein said means for updating said knowledge base comprises programming 15

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5 if said identified series is unknown to said knowledge
base, asserting data in said knowledge base data for
indicating said unknown identified series;
if said identified series contradicts said knowledge
base, retracting in said knowledge base data which
10 contradicts said identified series; and
if said identified series is already known to said
knowledge base, reasserting in said knowledge base
data for indicating said already known identified
series.

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2 26. In a computer system, a method for selecting help
3 messages for aiding a user of a computer program comprising the
4 steps of:

5 storing a help information database;
6 monitoring a series of user-directed events from an input
7 device;
8 generating data indicating said series of user-directed
9 events;
10 storing said generated data in a knowledge base; and
11 using the data indicating said series of user-directed
12 events stored in the knowledge base to select help information
13 from said help information database.

14 27. The method of claim 26, wherein said monitoring step
15 further comprises monitoring a system state.

16 28. The method of claim 27, wherein said monitoring a
17 system state step further comprises monitoring a machine state,
18 an application state, an accessory state, and a component state.

19 29. The method of claim 26, wherein said monitoring step
20 further comprises the steps of:
21 registering an application's menubar;
22 updating state information; and
23 updating a menubar.

24 30. The method of claim 26, wherein said generating data
25 step comprises generating an historical queue of said user-
26 directed events.

27 31. The method of claim 26, wherein said using step uses
28 data indicating a series of user-directed events comprising at
29 least two user-directed events.

1 32. The method of claim 26, wherein said using step uses
 2 data indicating a series of user-directed events that may
 3 comprise four or more user-directed events.

1 33. The method of claim 26, 31, or 32, wherein said series
 2 of user-directed events are events that are not necessarily
 3 related as being part of a particular command hierarchy.

1 34. The method of claim 26, further comprising the steps
 2 of:
 3 storing a plurality of rules for analyzing said generated
 4 data to determine appropriate help information; and wherein said
 5 using step further comprises using an inference engine to test
 6 said rules against the data stored in the knowledge base to
 7 select appropriate help information.

1 35. A help information system for aiding a user of a
 2 computer program comprising:

3 a computer having a processor and a memory;
 4 an output device coupled to said computer;
 5 an input device coupled to said computer;
 6 monitoring means coupled to the input device for monitoring
 7 a sequence of user-directed events and for generating data
 8 indicating said events;
 9 a knowledge base coupled to said monitoring means and stored
 10 in said memory, said knowledge base comprising said generated
 11 data, a plurality of rules for analyzing said generated data to
 12 determine appropriate help information, and a help information
 13 database for storing said appropriate help information; and
 14 inference engine means, coupled to said knowledge base, for
 15 applying said rules to said data to select appropriate help
 16 information for output by said output device to the user.

1 36. A help information system for aiding a user of a
 2 computer program comprising:

3 a computer having a processor and a memory;
4 a display device coupled to said computer;
5 an input device coupled to said computer;
6 monitoring means coupled to the input device for monitoring
7 a sequence of user-directed events and for generating data
8 indicating said events;
9 a knowledge base coupled to said monitoring means and stored
10 in said memory, said knowledge base comprising said generated
11 data, a plurality of rules for analyzing said generated data to
12 determine appropriate help information, and a help information
13 database for storing said appropriate help information;
14 inference engine means, coupled to said knowledge base, for
15 applying said rules to said data to generate inference engine
16 outputs;
17 selecting means coupled to said help information database,
18 for selecting appropriate help information in response to said
19 inference engine outputs; and
20 display engine means, coupled to said selecting means for
21 presenting said appropriate help information for display by said
22 display device to the user.

1 37. The system of claim 35 or 36, wherein said monitoring
2 means further comprises means for monitoring a system state.

1 38. The system of claim ³⁷37, wherein said means for
2 monitoring a system state comprises means for monitoring a
3 machine state, an application state, an accessory state, and a
4 component state.

1 39. The system of claim 35 or 36, wherein said monitoring
2 means comprises means, stored in memory and operably coupled to
3 the input device, for interpreting a series of user-directed
4 events and performing a history update based on the series.

1 40. The system of claim 35 or 36, wherein said knowledge
2 base further comprises an historical queue stored in memory and
3 operably coupled to said generated data.

1 41. The system of claim 35 or 36, wherein said inference
2 engine means comprises backward-chaining inference engine means.

1 42. The system of claim 35 or 36, wherein said inference
2 engine means comprises forward-chaining inference engine means.

1 43. The system of claim 35 or 36, wherein said help
2 information comprises textual help information.

1 44. The system of claim 35 or 36, wherein said help
2 information comprises graphical help information.

34 45. In a computer system, a method for aiding a user of a
2 computer program comprising the steps of:

3 storing a help information database;

4 monitoring a series of user-directed events from an input
5 device;

6 generating data indicating said series of user-directed
7 events;

8 storing said generated data in a knowledge base;

9 storing a plurality of rules for analyzing said generated
10 data to determine appropriate help information;

11 testing said rules against said generated data using an
12 inference engine, whereby rules which are satisfied by said data
13 are proved rules;

14 selecting in response to the proved rules appropriate help
15 information from said help information database; and

16 displaying said selected help information to the user.

1 46. In a computer system, a method for aiding a user of a
2 computer program comprising the steps of:

3 storing a help information database;
 4 monitoring a series of user-directed events from an input
 5 device;
 6 generating data indicating said series of user-directed
 7 events;
 8 storing said generated data in a knowledge base;
 9 storing a plurality of rules for analyzing said generated
 10 data to determine appropriate help information;
 11 detecting a request for help information from the user;
 12 testing said rules against said generated data using an
 13 inference engine, whereby rules which are satisfied by said data
 14 are proved rules;
 15 selecting in response to the proved rules appropriate help
 16 information from said help information database; and
 17 displaying said selected help information to the user.

1 ³⁵~~47~~. The method of claim ³⁴~~45~~ or ⁴⁷~~46~~, wherein said monitoring
 2 step further comprises monitoring a system state.

1 ³⁶~~48~~. The method of claim ³⁵~~43~~, wherein said monitoring a
 2 system state step further comprises monitoring a machine state,
 3 an application state, an accessory state, and a component state.

1 ³⁷~~49~~. The method of claim ³⁴~~45~~ or ⁴⁷~~46~~, wherein said monitoring
 2 step further comprises the steps of:

3 registering an application's menubar;
 4 updating a state information; and
 5 updating a menubar.

1 ³⁸~~50~~. The method of claim ³⁴~~45~~ or ⁴⁷~~46~~, wherein said testing step
 2 comprises the steps of:

3 (a) selecting from said plurality of rules a first group of
 4 rules corresponding to a first plurality of user-directed events;
 5 (b) attempting to prove each rule in said first group of
 6 rules;

(c) if a rule is proved, storing said rule as a proved rule in a plurality of proved rules; and

(d) repeating steps (a)-(c) for a subsequent group of rules until a rule is proved.

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~~51.~~ ³⁸ The method of claim 50, wherein step (b) comprises attempting to match a premise with each of said first group of rules with said generated data.

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~~52.~~ ³⁸ The method of claim 50, wherein step (c) comprises: if a rule is proved, storing said rule as a proved rule in a plurality of linked proved rules.

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~~53.~~ ³⁴ ⁴⁷ The method of claim 45 or 46, wherein said generating data step comprises generating an historical queue of said user-directed events.

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~~54.~~ ³⁴ ⁴⁷ The method of claim 45 or 46, wherein said rule storing step comprises storing premise-conclusion statements from said help information database.

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~~55.~~ ³⁴ ⁴⁷ The method of claim 45 or 46, wherein said displaying step comprises displaying textual help information to the user.

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~~56.~~ ³⁴ ⁴⁷ The method of claim 45 or 46, wherein said displaying step comprises displaying graphical help information to the user.

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~~57.~~ ³⁴ ⁴⁷ The method of claim 45 or 46, wherein said testing step comprises testing said rules against said generated data using a backward-chaining inference engine.

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~~58.~~ ³⁴ ⁴⁷ The method of claim 45 or 46, wherein said testing step comprises testing rules against said generated data using a forward-chaining inference engine.

1 59. In a computer system, a method for aiding a user of a
2 computer program comprising the steps of:
3 storing a help information database;
4 storing a knowledge base for maintaining data;
5 identifying a series of user-directed events;
6 comparing said identified series with data stored in the
7 knowledge base;
8 if said identified series is unknown to said knowledge base,
9 asserting in said knowledge base data for indicating said unknown
10 identified series;
11 if said identified series contradicts said knowledge base,
12 retracting in said knowledge base data which contradicts said
13 identified series;
14 if said identified series is already known to said knowledge
15 base, reasserting in said knowledge base data for indicating said
16 already known identified series;
17 storing a plurality of rules for analyzing said knowledge
18 base to determine appropriate help information;
19 testing said rules against said knowledge from the user;
20 testing said rules against said knowledge base using an
21 inference engine, whereby rules which are satisfied by data
22 stored in the knowledge base are proved rules;
23 selecting in response to said testing step appropriate help
24 information from said help information database;
25 and displaying said selected help information to the user.